

SPECTRUM[®]

RingView for FDDI User's Guide

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Preface

This document provides instructions for using RingView for FDDI, a SPECTRUM application that maps, models and graphically displays the contents of FDDI LANs.

Who Should Read This Guide

This guide is intended for SPECTRUM administrators and technicians responsible for determining network configuration and overseeing network operations. By following the instructions and procedures described herein, the reader will be able to use RingView to create and maintain accurate FDDI LAN models that will facilitate full exploitation of SPECTRUM's powerful management and monitoring capabilities.

This guide assumes that the administrative user is experienced with SPECTRUM and its administration as described in the **SPECTRUM Administrator's Reference**. Any user should also be familiar with the SpectroGRAPH™ user interface, and with the user functions explained in the **SPECTRUM Operator's Reference**.

How to Use This Guide

This guide contains both general information and detailed instructions. The document is organized as follows:

- Chapter 1 provides an overview of RingView functionality and features.
- Chapter 2 explains the process RingView uses to map and display the topology of an FDDI LAN.
- Chapter 3 describes the user interface for RingView and provides samples of the different varieties of FDDI LAN Topology views available.

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Chapter 1

Introduction

This chapter provides an overview of RingView functionality and features.

What Is RingView?

RingView for FDDI (Fiber Distributed Data Interface) is a SPECTRUM application program that provides enhanced capabilities for modeling and displaying the ring of devices and connections that make up an FDDI LAN.

An important feature of the RingView application is that it allows for several different ways of displaying these FDDI nodes within a SPECTRUM Topology view. For example, you can choose to view the topology of the ring in either a **“Ring of Trees”** arrangement or in **“Token Order.”** The “Ring of Trees” option essentially displays the physical configuration of the ring, as in Figure 1-1, where concentrators and/or workstations (referred to as “end nodes”) cascade from a series of concentrators (“rooted” nodes) that are attached directly to a dual counter-rotating ring of the fiber medium. The “Token Order” option provides a logical view of the ring, in which all nodes are arranged in a single ring showing the actual order in which the token is passed (Figure 1-2).

Figure 1-1. “Ring of Trees” FDDI Configuration

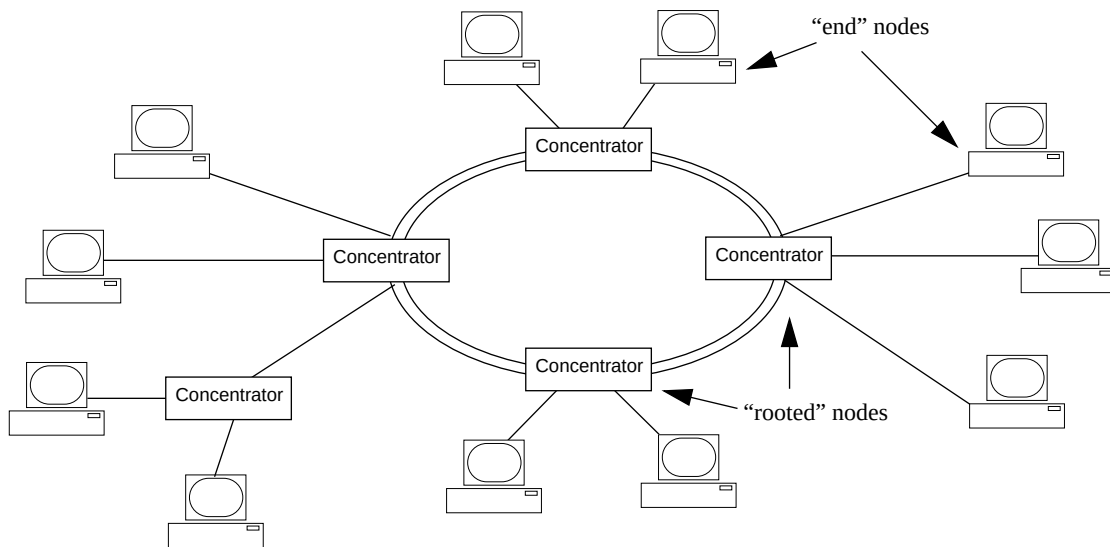
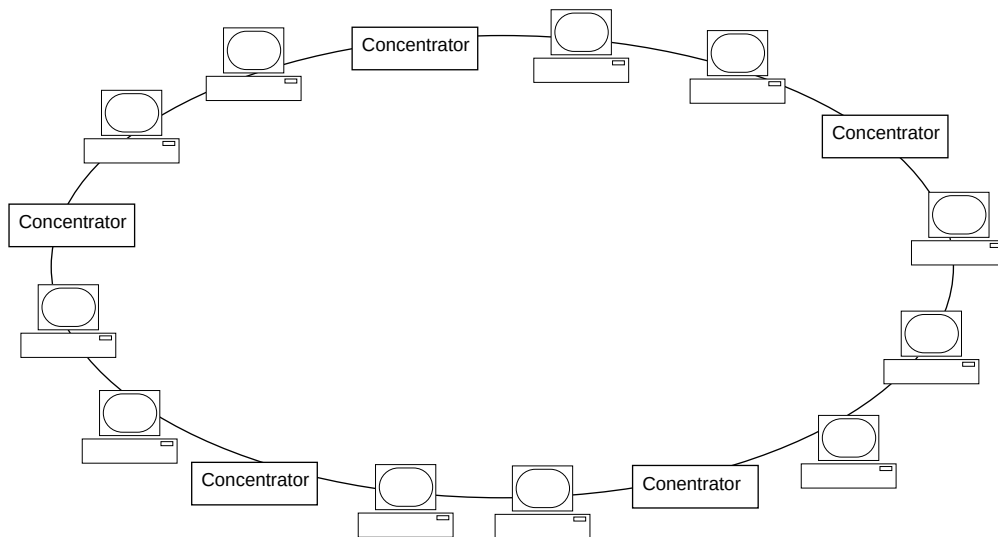


Figure 1-2. FDDI Nodes Arranged in Token Order



How RingView Works

In most cases, RingView operations are initially invoked by AutoDiscovery and are thus transparent to the user. If the IP address range you specify for an AutoDiscovery session includes a discrete FDDI LAN, AutoDiscovery will automatically create a model for the LAN and then activate the RingView application, which will attempt to model the LAN's contents. This is accomplished in one of two ways. If the LAN includes a device that supports Cabletron's Station Management MIB (CTSMTMIB), then the complete topology of the ring can be read from the MIB. If there are no such devices in the LAN, the topology is determined by using one of the standard FDDI MIBs defined by rfc 1285 and rfc 1512 to query each device in the LAN for information about its neighbors. This process is described in greater detail in Chapter 2.

After the initial modeling, you can keep the configuration of the ring current through a RingView Tools dialog box, which is accessed from the FDDI LAN model's Information view. These tools let you run subsequent discovery sessions on the LAN either manually or automatically. The dialog box also offers options for customizing the display of the ring topology. Examples of all these FDDI LAN Topology view options are provided in Chapter 3.



Chapter 2

The RingView Modeling Process

This chapter describes the methodology used by the RingView application to determine the topology of an FDDI LAN.

Basic Steps

The process RingView uses to determine the topology of a given ring is the same whether the application is invoked automatically by AutoDiscovery or manually through the “Discover Ring” button in the RingView Tools dialog box (see Chapter 3). In either case, the first step is to determine which existing models are part of the ring. This is accomplished by identifying those models that are associated with the FDDI LAN model through the SPECTRUM “collects” relation.

Once RingView has identified the set of models collected by the FDDI LAN model, it then examines these models to find out if any of them represent a Cabletron device that supports Cabletron’s Station Management MIB (CTSMTMIB). If so, the device will, by definition, keep track of all nodes on the ring, and RingView can map the complete topology of the ring based on that device’s station table.

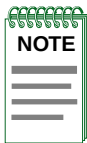


The CTSMTMIB-supporting device must be modeled using one of the Cabletron proprietary device model types in order for RingView to utilize the station table information. For example, if a Cabletron FDM device is modeled generically with the GnSNMPDev model type, RingView will not be able to access the station table.

If the set of models collected by the FDDI LAN model does not include a model that provides access to the complete station table, then RingView attempts to map the ring topology by querying each manageable FDDI device model in the set to obtain information about its upstream and downstream neighbors.

Use of MAC Addresses

Whichever mapping method is employed (reading a station table or querying individual models about their neighbors), RingView recognizes the existence of a node by its physical or MAC (Media Access Control) address. When RingView encounters a particular MAC address during this process, it first searches the database to see if the MAC address belongs to an existing model of one of the managed application model types (see the following section on Model Types for detailed descriptions of each type). If the MAC address does belong to an existing model, that model is added to the map of the ring. If not, RingView creates a GenFDDIMac_NM model to show that the MAC address is connected to the ring. The GenFDDIMac_NM model type (where “NM” stands for “No Management”) is used since there is no communication with the device, and thus no management information is available.



Some constraints apply to RingView in networks where DECnet protocol is involved, since DECnet differs significantly from TCP/IP in its handling of MAC addresses. Refer to “The RingView Tools Dialog Box” section of Chapter 3 for a discussion of these irregularities and the ways in which RingView accommodates them.

Mapping with Non-Manageable Devices

As noted in the previous section, a non-generically modeled Cabletron device that supports the CTSMTMIB can provide the complete topology of the ring. Thus, RingView can map the entire ring even if there is only one device modeled, so long as that device’s station table can be read. Although all of the other nodes would be modeled with the GenFDDIMac_NM model type in such a case, the models would still have the correct information as to the number of master and non-master ports and the type of attachment (i.e., “rooted node” attached directly to the dual ring or “end node” attached indirectly to the dual ring through a rooted node). Thus the models could be correctly placed within the topology map and would be displayed as either “dual-attached” (DAS or DAC) or “single-attached” (SAS or SAC) nodes.

Again, in cases where there is no Cabletron device model to provide station table information, RingView must query existing models about their neighbors. If all or most of the nodes on the ring have been modeled, then a complete and accurate ring topology can usually be derived. Note, however, that whenever a query returns an upstream MAC address that has no corresponding model in the database, RingView must create a GenFDDIMac_NM model. And since there is no communication with the modeled device, there is no way for RingView to determine the identity of the device’s upstream neighbor. In fact, for a non-manageable device, RingView can ascertain nothing beyond the MAC address. For mapping purposes, it is assumed that the device is a dual-attached station, and it is represented by a DAS icon in the resulting Topology view. But the device could also be a

concentrator attached to the dual ring, or it could be an end node (i.e., a single-attached station or concentrator). In other words, the existence of a GenFDDIMac_NM model denotes the unavailability of certain information. Therefore, the more times that creation of a GenFDDIMac_NM model is called for, the less likely it is that RingView will be able to map the ring completely.

Editing GenFDDIMac Information

Even though non-manageable devices can present problems as far as fully automatic mapping is concerned, you can easily circumvent these problems by manually providing additional information and then running RingView again. You provide the information by editing the GenFDDIMac_NM model's Information view, which is selectable from the Icon Subviews menu when the GenFDDIMac_NM icon is highlighted.

In the example shown by Figure 2-1, RingView has created the GenFDDIMac_NM model without access to a station table, thus the view displays the correct MAC address for the device itself and a default MAC address for its upstream neighbor. Since the device is assumed to be a dual-attached station, the Master Count field shows a value of zero to indicate the device has no M ports, and the Non_Master_Count field shows a value of two to indicate the presence of A and B ports. Note also that the Station Attachment button is set to "Rooted Node" rather than "Endnode." In this case, you would enter the actual MAC address for the upstream neighbor and change the other values as appropriate.

Figure 2-1. Information View for GenFDDIMac_NM Model

The screenshot shows a window titled "Primary Landscape 0x400000 VNM.topanga - 0.0.1D.8.53.8 of type GenFDDI Mac_NM". Inside the window is a dialog box titled "Non-Manageable FDDI Model Information". The dialog has a menu bar with "File", "View", and "Help?". It contains five input fields arranged vertically:

Master Count	0
Non_Master_Count	2
Device MAC Address	0.0..1D.8.53.8
Upstream MAC Address	0.0..F8.0.00.00
Station Attachment	Rooted Node

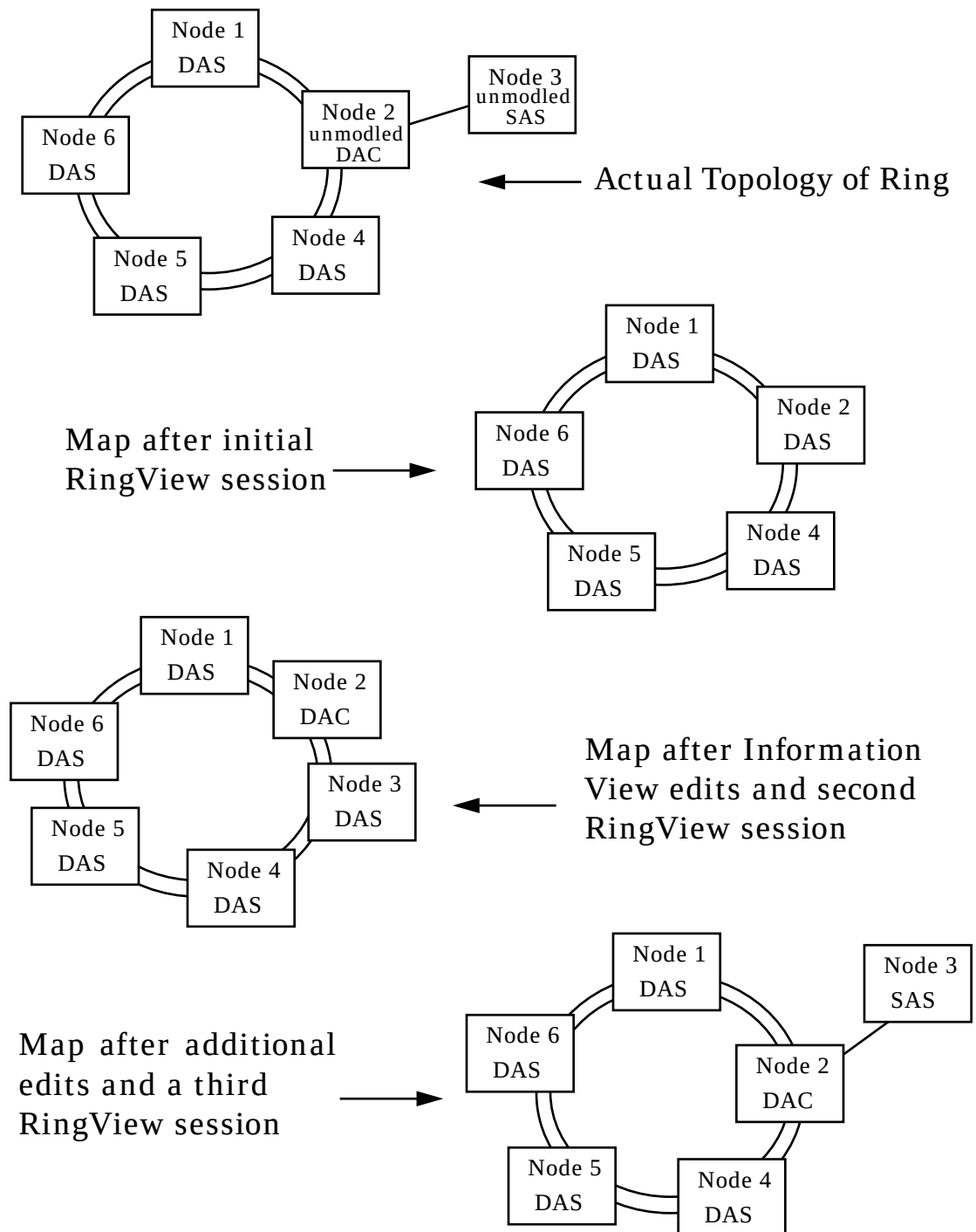
After saving your edits to the GenFDDIMac Information View, you can run RingView again by bringing up the Information View for the FDDI LAN and opening the RingView Tools dialog box (see Chapter 3 for illustration and detailed instructions). The additional information provided by your edits will allow RingView to re-map the ring and generate a more comprehensive topology.

Figure 2-2 shows how this process would work for a partially modeled ring of non-Cabletron devices in which each of the manageable devices supports the 1285 FDDI MIB and can thus provide RingView with the MAC address of its upstream neighbor. As the top diagram in this example shows, the ring consists of six nodes, two of which (Nodes 2 and 3) have **not** been modeled in SPECTRUM. The first time RingView attempts to map this ring, it obtains the MAC address of Node 2 from Node 1 and creates a GenFDDIMac_NM model, which is displayed as a dual-attached station (DAS). At this point, there is no way for RingView to know about the existence of Node 3; consequently the second diagram shows only five nodes.

The third diagram, however, shows the complete ring as it would be mapped after the Information View for the GenFDDIMac_NM model representing Node 2 has been edited to provide port information for Node 2 as well as the MAC address of its upstream neighbor, Node 3. Since the edit has specified that Node 2 has four master ports and two non-master ports, RingView can now identify the node as a dual-attached concentrator (DAC). Once again, since RingView knows nothing about Node 3 except its MAC address, it creates a GenFDDIMac_NM model and assumes the node is a dual-attached station.

In the final diagram, another edit has provided the correct port and attachment information for Node 3, and a subsequent RingView session displays the node as a single-attached station (SAS) and positions it off the dual ring as an end node rather than rooted node.

Note that edits of this extent are only necessary if you require a mapping of the physical connectivity as shown in the bottom diagram. RingView can correctly map the token order (as in the third diagram) as soon as all MAC addresses are determined.

Figure 2-2. RingView Sessions with Manual Intervention

RingView Modeling

Several different model types are used to model the nodes on an FDDI ring. These model types fall into two basic categories: those that represent devices and those that represent managed applications of devices.

Device Model Types

RingView does not create models of the actual FDDI devices. These models are created manually by a user or automatically by the AutoDiscovery application. RingView does however use the device models to create models of FDDI applications associated with these devices. Thus the device model types used by RingView include any that support devices with FDDI interfaces. For example, the model type **BdgCSIFDM** is used to model Cabletron's FDDI Bridge and Management Module, commonly referred to as the FDM. In the case of non-Cabletron, SNMP-compliant devices for which there is no vendor-specific model type, the **GnSNMPDev** model type may be used.

Managed Application Model Types

In addition to the device model types used by RingView, there are also a number of model types that represent managed applications of FDDI devices. Models of these types are created automatically at the same time the associated device model is created based on the model type of the device and the particular FDDI MIB it supports. Upon creation, application models are placed in the associated device model's Application view. RingView will place them in the FDDI LAN Topology view as appropriate, from where they can be manually copied into other views, if desired. These model types can be further broken down into those created by SPECTRUM and used by RingView and those created specifically by RingView.

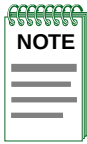
Created by SPECTRUM

HubCSIFDDI	This type is used to model the FDDI Hub Application, which manages concentrator functionality for the FDM in accordance with the standard FDDI MIB defined by rfc 1285.
FddiSMT	Used to model the Station Management application for the FDM, EMM-E6, ESXMIM and other Cabletron devices that support Cabletron's FDDI Bridge/Router Interface Modules (BRIMs) and the standard FDDI MIB defined by rfc 1512.

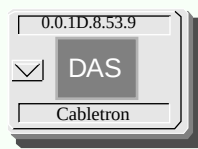
FddiMAC	Used to model the intelligent connection between an MMAC-Plus module and the Flexible Network Bus (FNB) on the backplane of the MMAC-Plus chassis.
FddiNoMAC	Used to model a non-intelligent connection between an MMAC-Plus module and the Flexible Network Bus (FNB) on the backplane of the MMAC-Plus chassis.

Created by RingView

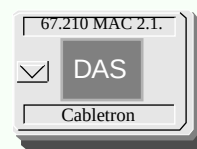
GenFDDIMac_I	Used for modeling applications associated with devices that support the 1285 FDDI MIB and have been modeled with either the GnSNMPDev model type or a specific third-party model type. The GenFDDIMac_I model appears in the Application view of the associated GnSNMPDev model and on the device port of an FDDI interface within the DevTop view.
GenFDDIMac_II	Used for modeling applications associated with devices that support the 1512 FDDI MIB and have been modeled with either the GnSNMPDev model type or a specific third-party model type. The GenFDDIMac_II model appears in the Application view of the associated GnSNMPDev model and on the device port of an FDDI interface within its DevTop view.
GenFDDIMac_NM	Used for modeling MAC addresses of non-manageable devices that are determined to be part of the ring but for which no corresponding model exists in the SPECTRUM database.



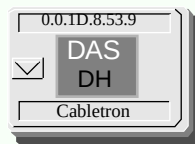
RingView-created models of the types described above are represented in Topology views by icons that are labeled DAS, DAC, SAS, or SAC to indicate the connectivity and function of the modeled node (dual-attached station, dual-attached concentrator, single-attached station, or single-attached concentrator). Although you can't visually determine the exact model type represented by one of these icons in every case, the label at the top of the icon does indicate whether the icon represents a GenFDDIMac_NM model, in which case the label will show the MAC address of the modeled node. For GenFDDIMac_I and GenFDDIMac_II models, the label will show the last two octets of the IP address and the SMT.MAC index. In any case, the banner of the Information view for any of these models will identify the precise model type.



Icon for GenFDDIMac_NM

Icon for GenFDDIMac_I
or GenFDDIMac_II

Note also that DAS or DAC icons representing devices that are “dual homed” (i.e., attached to one concentrator via the A port and a different concentrator via the B port) will also be labeled “DH” to indicate this configuration. See Chapter 3 for examples of how these icons are used in FDDI LAN Topology views.



Icon for Dual Homed DAS



Chapter 3

The User Interface

This chapter explains how to access and operate the dialog boxes that serve as the user interface for the RingView component of SPECTRUM.

Accessing RingView Tools

Once an FDDI LAN has been modeled in SPECTRUM either manually or through a regular AutoDiscovery session, subsequent discovery sessions can be invoked for that LAN through the RingView Tools dialog box, which is accessed from the FDDI LAN's Information view (Figure 3-1). You can access this view in either of two ways:

- click on the FDDI LAN icon, then select the Model Information option from the Icon Subviews menu.

or

- if the FDDI LAN Topology view is already open, select the Current View Information option from the File menu.

Clicking on the RingView Tools button in the bottom right corner of the FDDI LAN Information view brings up the RingView Tools dialog box shown in Figure 3-2.

Figure 3-1. The FDDI LAN Information View

Primary Landscape 0x00400000 - VNM Topanga- RingView 2.1 of type FDDI

* **File View Help?**

FDDI LAN Information View

FDDI LAN Name Automapped LAN	Contact Status Established
Subnet Address	Condition Green
Subnet Mask 0.0.0.0	Rollup Condition Orange
Security String	Polling Status True

Internal Attributes

Condition Valueh

Composite Conditionw

Child Count Attributes

Child Count

Initial Child Count

Lost Child Count

Significance Level

Value when Yellow

Value when Orange

Value when Red

Select Monitor Point

Monitors

132.177.118.24 20

Threshold Values

Packet Rate High

Packet Rate Low

Load High

Load Low

Error Rate High

Error Rate Low

Rollup Thresholds

Yellow Threshold

Orange Threshold

Red Threshold

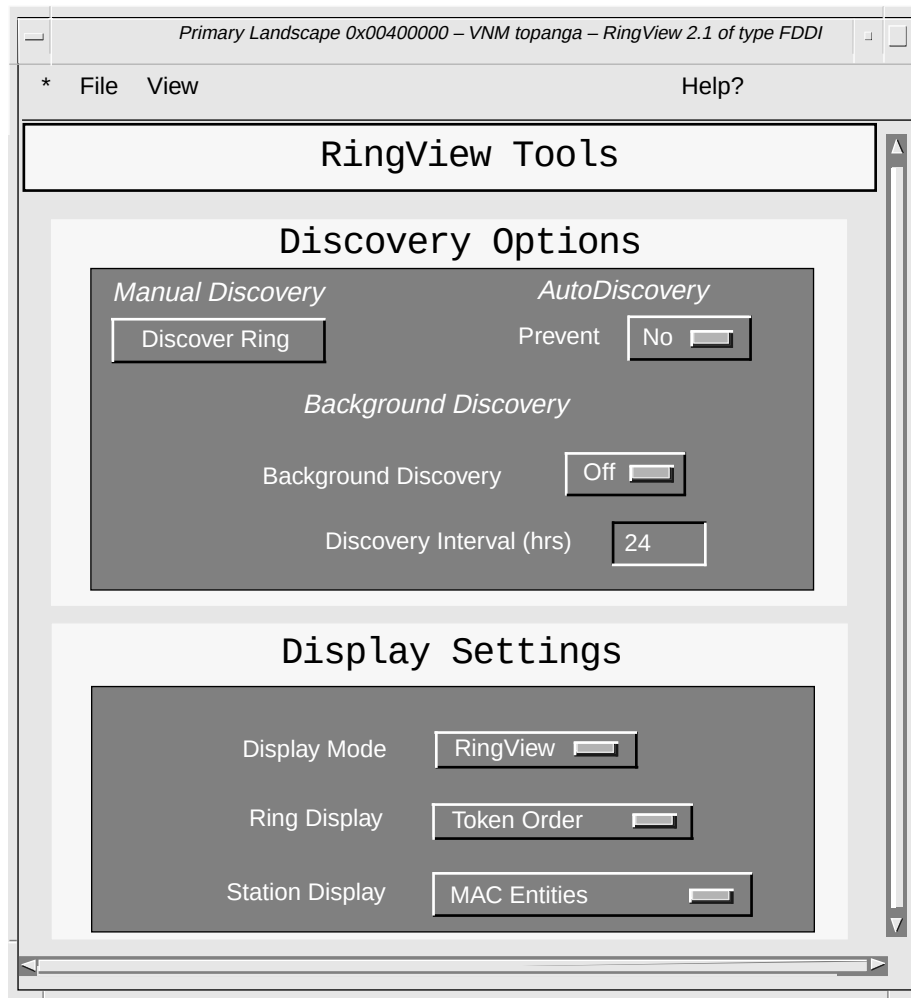
Monitor Point

Monitor Point Model Name

Monitor Point Model Type

OK Cancel
RingView Tools

Figure 3-2. RingView Tools Dialog Box



The RingView Tools Dialog Box

The RingView Tools dialog box provides you with various options for controlling when and how discovery operations are performed on the selected FDDI LAN and how the discovered configuration will be depicted.

Discovery Options

The Discovery Options panel at the top of the dialog box lets you start a discovery session for the FDDI LAN at any time by clicking on the **Discover Ring** button. An “Action successful” message box will be displayed to inform you when the discovery session is completed. Click on “Close” to dismiss the message box. The results of the discovery session will then be visible in the FDDI LAN Topology view. Note that you can still run a discovery session using the Discover Ring button regardless of the Background Discovery or AutoDiscovery/Prevent settings described below.

If you wish to run discovery sessions at pre-determined intervals, the **Background Discovery** toggle button must be set to “On.” Intervals are defined in hours by entries you make in the Discovery Interval field. The default value is 24 hours.

The other toggle button in this panel lets you preserve any customizations you make to the FDDI LAN topology by preventing subsequent sessions of AutoDiscovery from launching RingView. Set the Prevent button to “Yes” to preserve your customizations. See the following note concerning the use of RingView when **DECnet protocol** is present.



As noted in Chapter 2, there is a fundamental incompatibility between the ways in which RingView and DECnet treat MAC addresses. RingView's basic mapping methodology depends on the MAC address being used as a constant and unique node identifier. However, the MAC address of a DECnet node may change whenever the DECnet protocol is started or restarted. Thus RingView may encounter both an original MAC address and a DECnet-assigned MAC address for the same node. Also the same MAC address may be used for each of a DECnet node's interfaces.

To deal with the problem of a node's address changing, RingView will automatically default the Prevent AutoDiscovery setting to “Yes” whenever a DECnet MAC address is detected. You can then run RingView on-demand at a time when the network is known to be stable.

The problem of duplicate MAC addresses requires some user action. If the FDDI LAN Topology view resulting from an initial AutoDiscovery session contains wrong or duplicate DECnet MAC address models, you will need to determine which one actually represents the device, then erase the others from the view. The correct model will now be associated with the FDDI LAN through SPECTRUM's “Collects” relation, and a subsequent session of RingView will be able to accurately map the ring topology.

Display Settings

The Display Settings panel at the bottom of the dialog box lets you customize the associated Topology view using the following three selector buttons.

Display Mode

This button lets you choose between a non-editable **RingView** mode and an editable **Normal** mode. In RingView mode, the display is governed by the RingView software and will show only entities that have been determined to be part of the ring (i.e., no Off-Page Reference icons will appear). Note also that the display is locked. This means the FDDI LAN model can NOT be destroyed, even if it was created manually rather than by RingView. Also, no annotations, manual repositionings of icons, or other edits are permitted when this mode is in effect. In Normal mode, the display may be edited in the same manner as any regular SPECTRUM Topology view. However, any icon position changes or manual pipe connections you make in Normal mode will not be preserved if you then switch back to RingView mode. Annotations and background color settings will remain in effect when you switch modes, but the presence of any annotation made in Normal mode will prevent the RingView mode from being able to display the graphical representation of the dual ring described below.

Ring Display

This button lets you choose between viewing the FDDI LAN in **Token Order** (a single ring of nodes positioned according to the order in which the token is actually passed), or in a **Ring of Trees** configuration, in which icons representing rooted nodes are superimposed directly upon a graphical representation of the dual counter-rotating ring, and end nodes (entities connected to the “M” ports of rooted nodes) are attached to the rooted node icons via regular SPECTRUM connection pipes. Figures 3-3 and 3-5 show an FDDI LAN as it might appear with Token Order selected. Figures 3-4 and 3-6 show the Ring of Trees configuration.

Station Display

This button lets you determine whether the icons displayed in the FDDI LAN Topology view will represent models of **MAC Entities** (SAS, DAC, DAS as in Figures 3-3 and 3-4) or **Physical Devices** (BdgCSIFDM, GnSNMPDev as in Figures 3-5 and 3-6).

The default settings are RingView mode with MAC Entities in Token Order. In order for any setting changes you make to take effect, you must first save them by selecting the File menu’s “Save All Changes” option. Alternatively, you can set your SpectroGRAPH so that you can press the right mouse button to display the Commit Changes message box and then click on the OK button.

RingView Displays

The following four figures (3-3 through 3-6) show how the same ring would be depicted using each of the four different combinations of FDDI LAN Topology view options selectable from the Display Settings panel of the RingView Tools dialog box. Figure 3-7 shows the DevTop view for the Rtr_CiscoAGS model displayed in Figures 3-5 and 3-6.

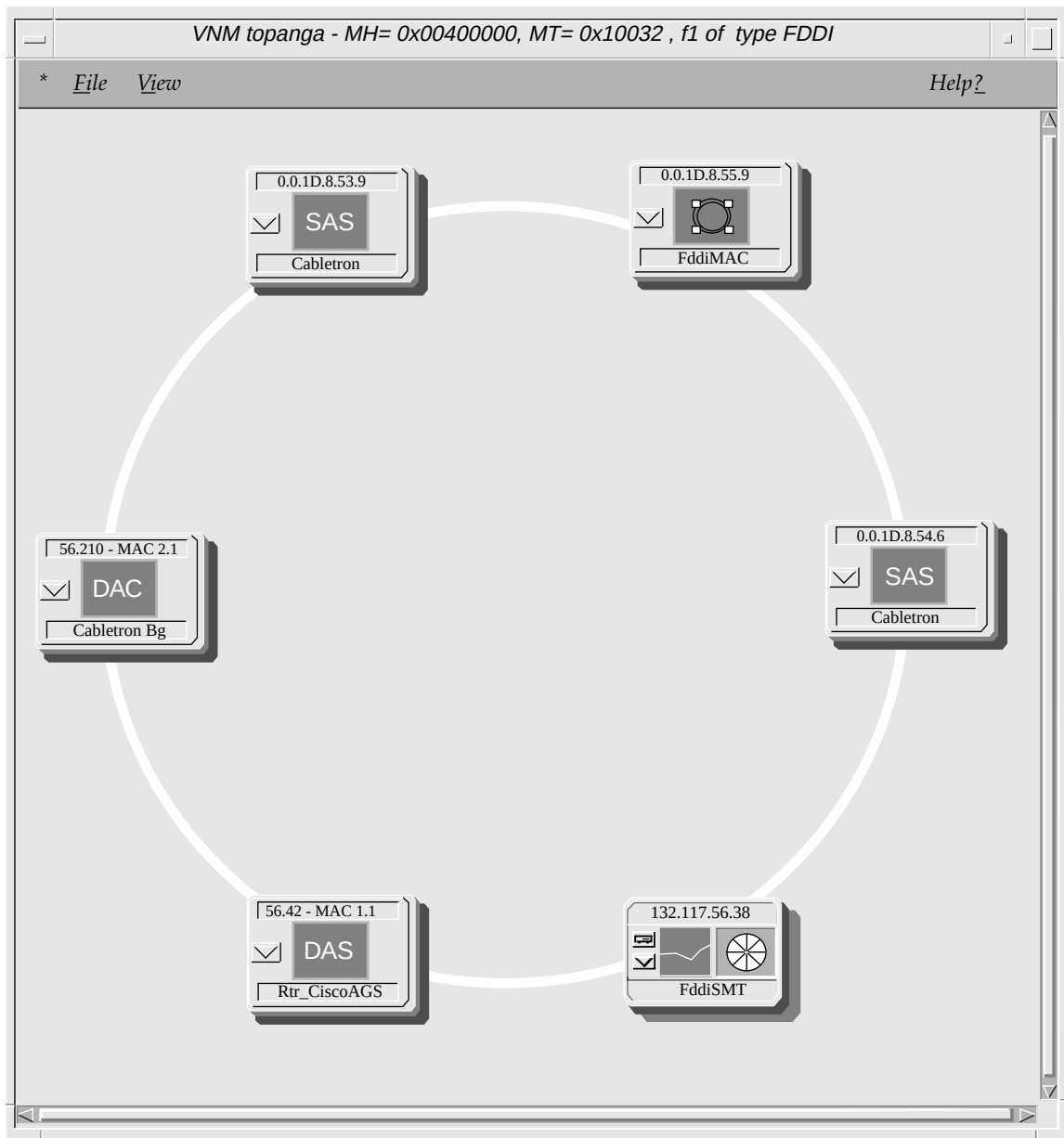
Figure 3-3. MAC Entities in Token Order

Figure 3-4. MAC Entities in Ring of Trees

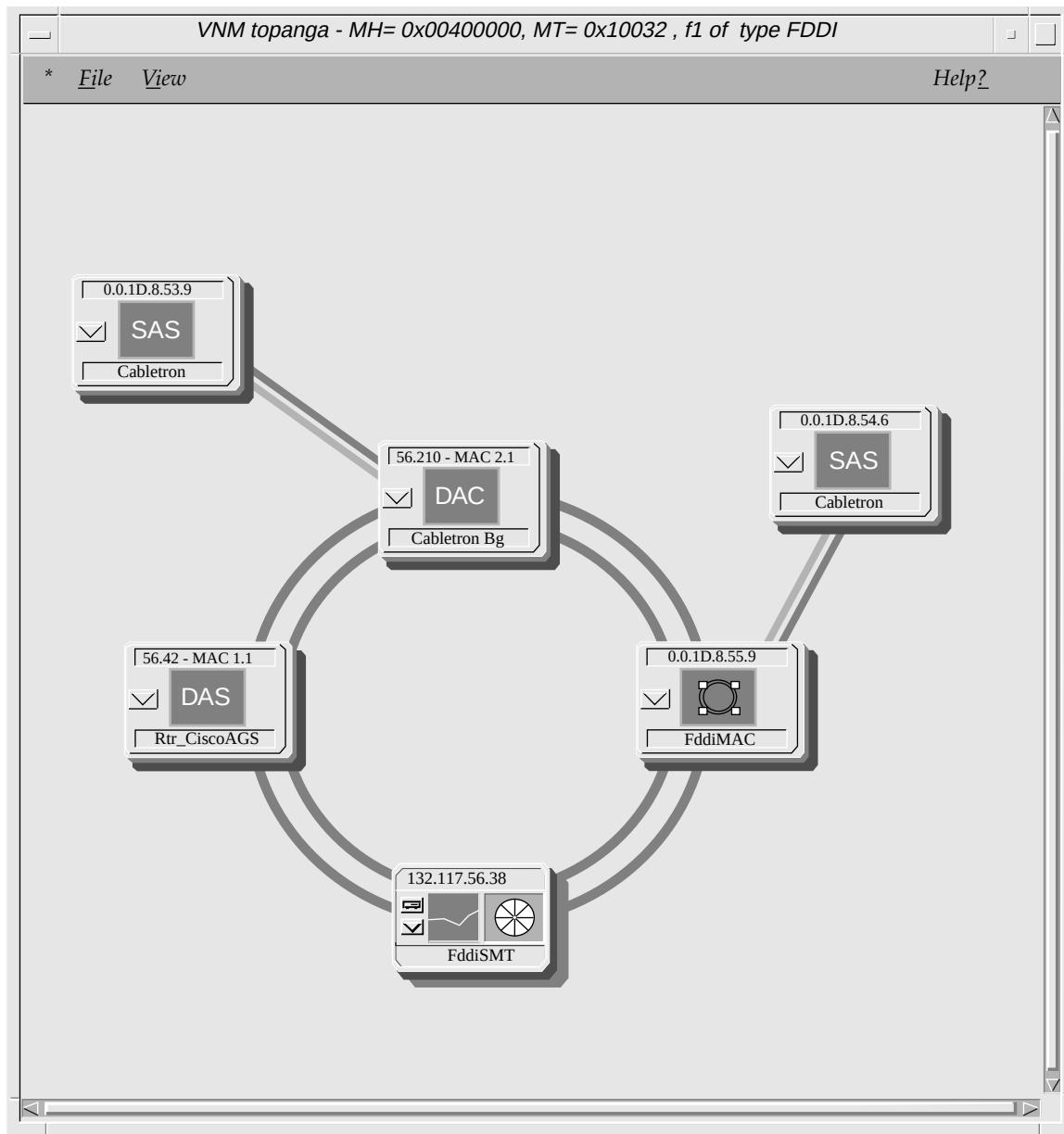


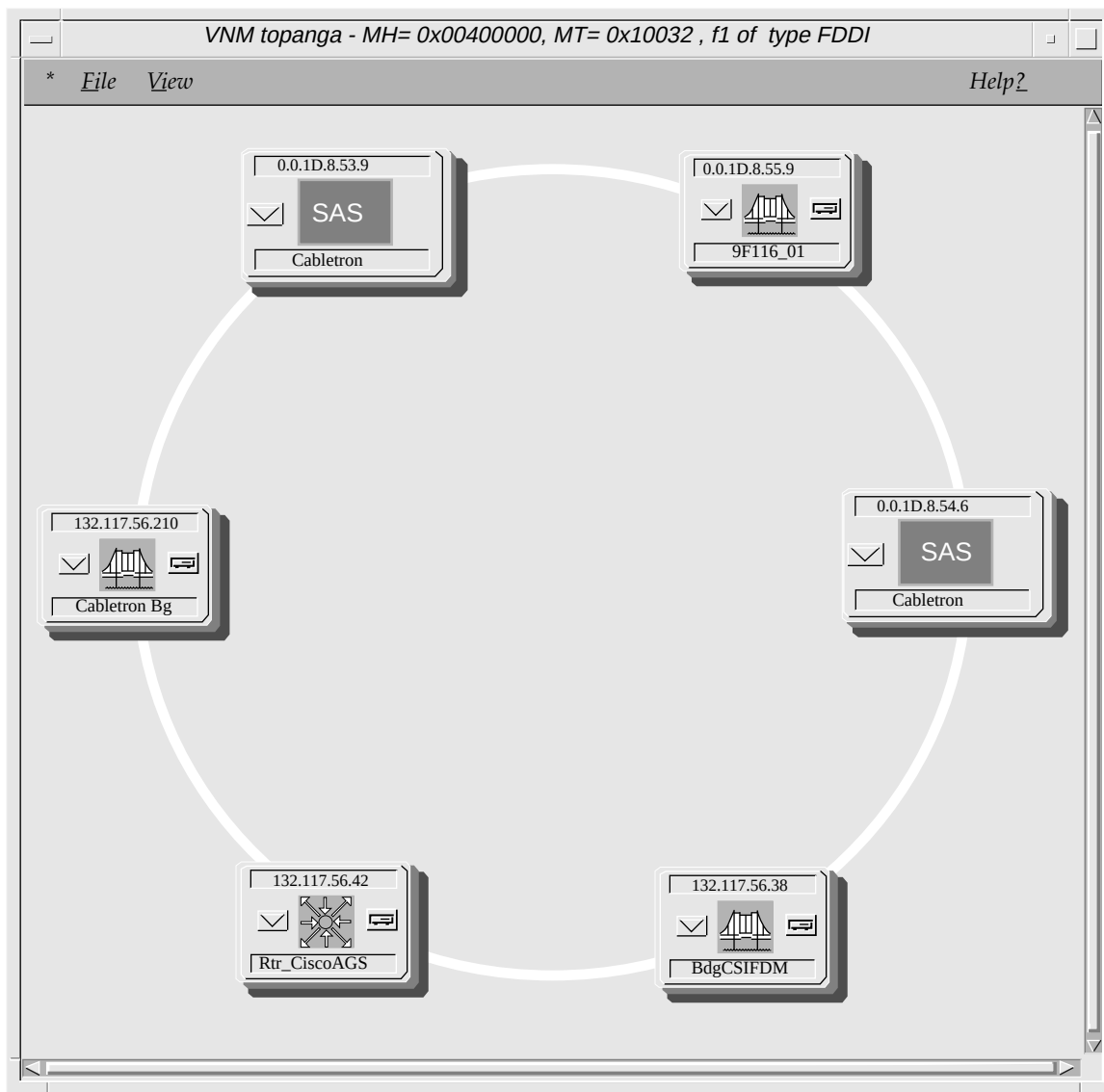
Figure 3-5. Physical Devices in Token Order

Figure 3-6. Physical Devices in Ring of Trees

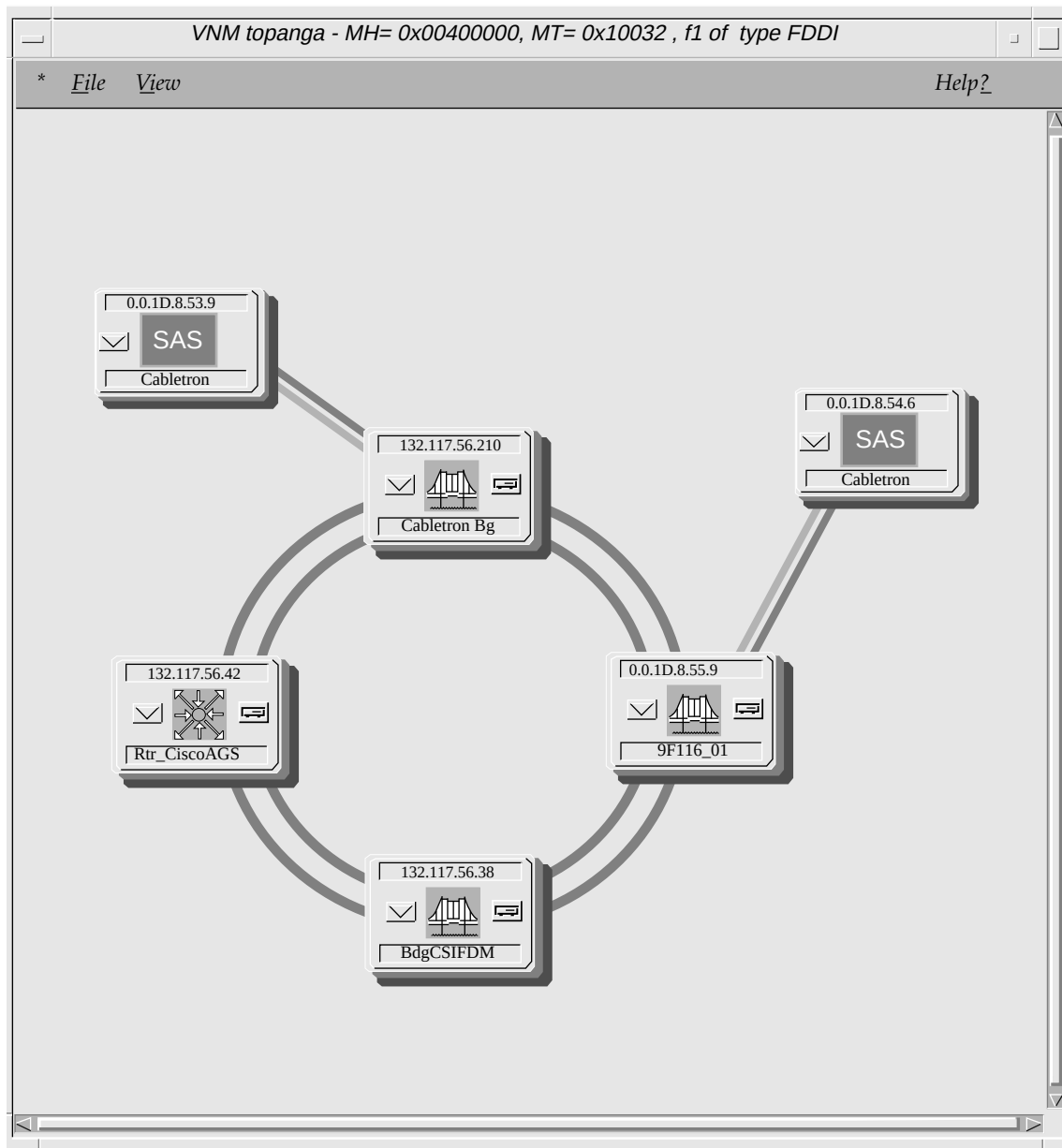
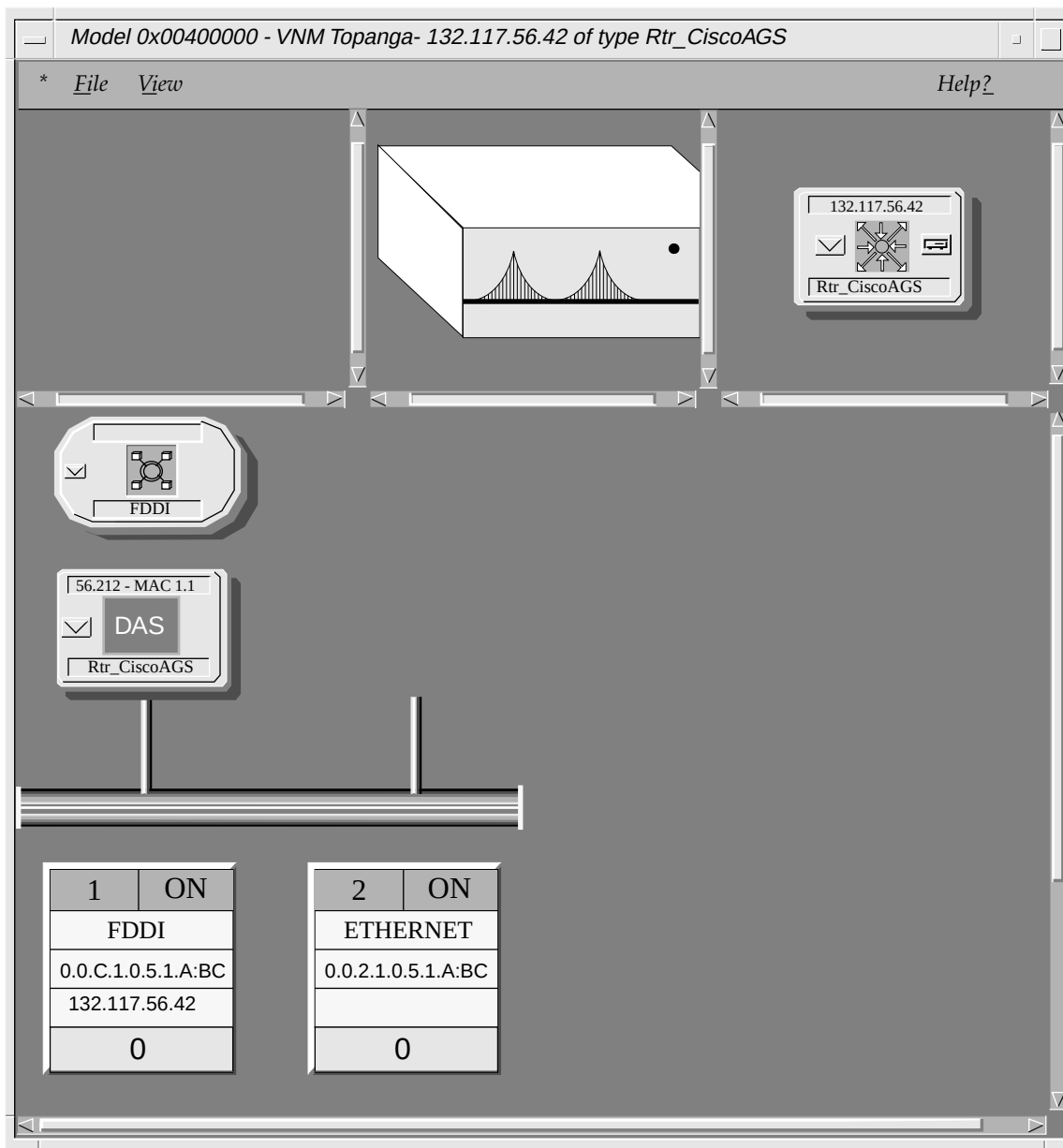


Figure 3-7. DevTop View

RingView Alarms

RingView generates yellow alarms for models of the FDDI nodes which are in either a wrapped state or a twisted state. Alarms are generated dynamically

any time a model of a rooted node enters a wrapped state. However, alarms for nodes in a twisted state are only generated when RingView discovery is run on an FDDI LAN.



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